

WOMEN IN STEM

UNIT 2: NOW & THEN

Some people disagree about whether gender discrimination in science still exists. Where one person may believe that women no longer face bias in STEM, another person may believe that they do. What evidence exists that efforts to increase girls and women in STEM have been successful? What evidence exists that such efforts have not worked?

CURRICULUM CONNECTIONS

Social Studies; people and groups; history; stereotypes and societal norms

LEARNING OUTCOMES

- **Describe** a stance (i.e., opinion or position) on the issue and provide evidence.
- **Think critically** about ideas related to the issue.
- **Work collaboratively** to discuss effective ways to convince others of your stance.
- **Identify evidence** or information from valid sources to support opinions.
- **Apply evidence** or information to support arguments.
- **Communicate** effectively and respectfully with others when discussing the issue and how it might be addressed.
- **Think critically** about ideas related to the problem.

SUGGESTED GROUP SIZE: 10 TO 30

SUGGESTED TIME: 2 TO 4 HOURS





INTRODUCTION AND BACKGROUND INFORMATION

Historically, women have been underrepresented and under recognized in science, technology, engineering and mathematics (STEM). In the past, many science departments did not admit women as students or appoint women as faculty. The reasons for this discrimination are complicated and social scientists have studied why women continue to be underrepresented. Some evidence shows that the gender gap in science is closing, while other evidence suggests that the gap grows larger in some areas.

For example, one study might show that people prefer to hire men in science¹, while another study suggests that there is no hiring bias on the basis of gender when hiring science faculty members².

How can we understand this conflicting information? How has women's participation in STEM changed over the past several decades? This discussion will get students thinking and talking about women's underrepresentation in STEM over time.

DELIBERATE/DEBATE THIS QUESTION:

In the past several decades, what evidence shows that gender equity in STEM has increased vs. decreased?

GUIDING QUESTIONS

1. What evidence exists that gender equity in science has improved over time?
2. What evidence exists that gender equity in science has NOT improved over time?
3. What are the potential consequences of arguing that gender equity in science has improved over time?
4. What are the consequences of arguing that gender equity in science has NOT improved over time?
5. How can evidence be used to support one side of an argument?
6. Can the same piece of evidence be used to support both sides of a debate?

POSTERS

- Irene Ayako Uchida
- Ann Makosinski

¹ Moss-Racusin et al., 2012

² Williams & Ceci, 2015



RECOMMENDED PROCESS

1. Arrange the physical space and materials prior to beginning the discussion. For deliberative discussions, sometimes educators like to divide the classroom into two opposing sections.
2. Provide all students with the necessary background information about the topic.
3. Provide all students with an overview of the discussion and activity.
4. Assign students to one of two stances:
 - a. Gender equity in STEM has historically increased.
 - b. Gender equity in STEM has historically decreased.
5. Each group should work together to research evidence to support the groups' stance. It does not matter what the student's personal beliefs are about the topic, but rather, how they can use information in a way that supports one particular view.
6. Encourage groups to:
 - a. Provide evidence for the assigned stance.
 - b. Apply evidence strategically to persuade others about the group stance.
 - c. Discuss as a class how each stance was supported or not and if a conclusion can be reached.
 - d. Debrief with the educator to review what it was like to support an idea if it was in line with existing beliefs or not.

Remember to...

- ✓ Establish expectations about taking turns to speak so that all students have their voices heard.
- ✓ Encourage students to listen and speak throughout the discussion.
- ✓ Remind students that it is useful to argue a stance that you do not necessarily agree with.
- ✓ Promote an environment of respectful conduct, even when students disagree.
- ✓ Remember that topics related to equity, diversity, and inclusion may bring up strong attitudes or opinions.
- ✓ Reinforce the idea that all people may have a different understanding about an issue, so showing compassion for each other throughout learning is critical.



ADAPTING TO DIFFERENT GRADE LEVELS

Grades 4-6: Deliberative discussions in fourth to sixth grades should be focused on the following:

- How can you find evidence that is trustworthy?
- Where can valid information be found to support your stance?
- How is evidence different than opinion?
- How can you argue one side of an argument for debate, but perhaps not personally hold the same opinion.

Social Studies for this grade range involves critical evaluation of societal information and perspective-taking, therefore focusing on how to evaluate information about gender equity in science and holding conflicting views is appropriate.

Grades 6-8: Deliberative discussions in sixth to eighth grades should be focused on the following:

- Establishing credible sources for evidence to support opinions.
- Consideration of how evidence can be viewed differently over time and by different people

Social Studies for this grade range involves topics like critical assessment of power structures, therefore focusing on how power, time, and social forces impact credibility of evidence is appropriate.

Grade 9+: Deliberative discussions in ninth and greater grades should focus on the following:

- How can evidence be used to support one side of an argument?
- Can the same piece of evidence be used to support both sides of a debate?

Social Studies for this grade range involves topics like civic or political engagement and the individual's ability to impact society, therefore focusing on how evidence can craft persuasive arguments is appropriate.



REFERENCES

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, 109(41), 16474-16479.

Williams, W. M., & Ceci, S. J. (2015). National hiring experiments reveal 2: 1 faculty preference for women on STEM tenure track. *Proceedings of the National Academy of Sciences*, 201418878.